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LLORANG GROUP NO.

BUREAU OF SHIPS GROUP

TECHNICAL INSPECTION REPORT

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Classification (Cancelled) (Changed to **CONFIDENTIAL**,
By Authority of *Joint Chiefs of Staff* Action of 15 April 1969
By *Joint Chiefs of Staff* Date 2 May 69
Ref. AF SUP

U.S.S DENTUDA (SS335)

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1 JAN 1965
REG. NO. **3327**

9 BUREAU OF SHIPS GROUP
TECHNICAL INSPECTION REPORT

⑥ OPERATION. CROSSROADS.
U. S. S. DENTUDA (SS335).
TESTABLE [RE]. ⑧

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By Authority of Joint Chiefs of STAFF Action of 15 April 1945
2. *General Order 28 Apr 51*
1st Lt. AFS w/P

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USS DENTUDA (SS335)

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~~SECRET~~ **USS DENTUDA (SS335)**

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U.S.S. DENTUDA (SS335)

SHIP CHARACTERISTICS

Building Yard: Electric Boat Company.

Commissioned: 30 December 1944.

HULL

Heavy Hull Construction.

Length Overall: 311 feet 9 inches.

Length (between perpendiculars): 307 feet 0 inches.

Beam (extreme): 27 feet 3 inches.

Beam (molded): 26 feet 0 1/2 inches.

Height (lowest point of keel to top of periscope supports): 47 feet 4 inches.

Drafts (at time of test): Fwd. 16 feet 0 inches.
Aft. 16 feet 9 inches.

Standard Displacement: 1525 tons.

Displacement (at time of test): 1995 tons.

MAIN PROPULSION PLANT

Main Engines: Four General Motors, 16 cylinder,
Type 16-278A.

Auxiliary Engine: General Motors, 8 cylinder,
Type 8-268.

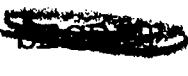
Main Motors and Generators: General Electric.

Main Storage Battery: Exide.

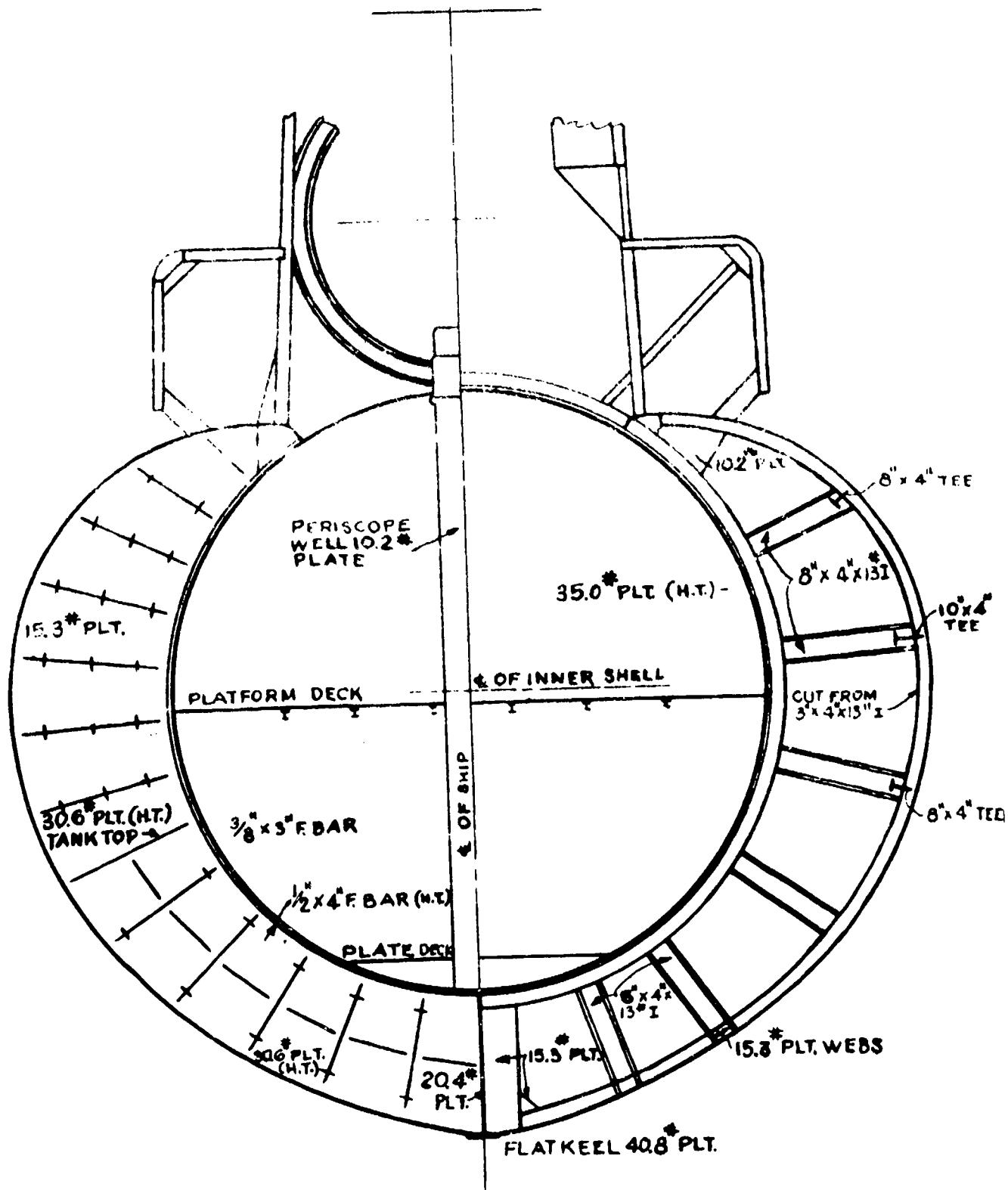
Main Controls: General Electric.

Reduction Gears: General Electric.

Diesel Electric Drive.

 USS DENTUDA (SS335)

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FRAME 52

LOOKING FWD.

FRAME 49

LOOKING FWD.

TEST A

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U.S.S. DENTUDA (SS 335)

TECHNICAL INSPECTION REPORT

OVERALL SUMMARY

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

Draft and list were normal after the test; no flooding occurred.

(b) Structural Damage.

There was no structural damage.

(c) Other Damage.

Machinery, electrical, ship control, fire control and electronic equipment was fully operable after the test except the starboard side-light and the stern light had broken filaments.

II. Effects of Damage.

(a) Heat.

There is a very slight scorching of the outer coat of paint on the vertical surfaces of the starboard side of the superstructure and conning tower fairwater. No scorching was noted on horizontal surfaces or where the vertical surfaces were shielded by other structures. The heat flash appears to have come from approximately 110° relative. There were no apparent reflections of heat wave back onto a surface which did not face the blast. The scorching is more severe near the top of the periscope shears than lower on the conning tower fairwater.

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USS DENTUDA (SS335)

(b) Fires and explosions.

No fires or explosions occurred.

(c) Shock.

The starboard sidelight and the stern light were damaged by shock. The damage was confined to the globes. They were not shattered but the filaments were broken. The lights operated properly when new globes were installed. The blast seemed to hit the ship well on the starboard quarter. No other equipment showed any effects due to shock.

(d) Pressure.

The "Coordinator's report on air blast and water shock for Tests A and B" of 27 September 1946 indicates that the peak air pressure was approximately 5.0 lbs. per square inch and the duration of the positive pressure phase was about 0.95 seconds. The elastic deformation of the single hull, measured at four stations, was less than 0.0103 inches.

(e) Effects apparently peculiar to the atom bomb.

An unusual evidence of the brief duration of heat from the atom bomb blast was noted on the after cigarette deck. Although the starboard side of the thermometer was burned and blistered, the high temperature did not last long enough to raise the thermometer reading above 96°F. Other effects were pressure and slight radioactivity.

III. Effects of Damage.

(a) Effect on machinery, electrical and ship control.

None.

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(b) Effect on gunnery and fire control.

None.

(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

It is believed there would have been no effect on personnel inside the sealed pressure hull, but that exposed topside personnel would have suffered severe flash burns. Habitability was unimpaired.

(e) Total effect on fighting efficiency.

There is no reduction in fighting efficiency from a material standpoint. Exposed personnel topside would have been at least temporarily out of action.

IV. General Summary of Observers' Impressions and Conclusions.

The DENTUDA had been moored on the surface at a distance of approximately 1900 yards from the burst. From the inspection the impression is formed that this ship was subjected to a directional flash of more or less instantaneous heat followed by a relatively high velocity wind. It is concluded that a submarine on the surface at this distance from an explosion of the type experienced in Test A will not be affected from a material standpoint but would have casualties among exposed topside personnel. Had the submarine been submerged, there would have been no damage and no casualties. For general views of the DENTUDA after Test A see photographic section on pages 30 to 37.

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V. Preliminary Recommendations.

If it is expected that submarines will be subject to such an attack it appears desirable to protect topside personnel to the maximum extent with clothing and structural enclosures. As there is no significant material damage to this vessel, no further recommendations are submitted herein.

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USS DENTUDA (SS335)

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TECHNICAL INSPECTION REPORT

SECTION I - HULL

GENERAL SUMMARY OF HULL DAMAGE

I. Target Condition After Test.

- (a) Drafts after test; list; general areas of flooding, sources.

There was no flooding and no change in list or draft.

- (b) Structural damage.

There was no structural damage.

- (c) Other damage.

Not observed.

II. Forces Evidenced and Effects Noted.

- (a) Heat.

There is a very slight scorching of the outer coat of paint on the vertical surfaces of the starboard side of the superstructure and conning tower fairwater. No scorching was noted on horizontal surfaces or where the vertical surfaces were shielded by other structure. The heat flash appears to have come from approximately 110° relative. There were no apparent reflections of the heat wave back onto a surface which did not face the blast. The scorching is more severe near the top of the periscope shears than lower on the conning tower fairwater.

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(b) Fires and Explosions.

None.

(c) Shock.

No evidence.

(d) Pressure.

The "Coordinator's Report on Air Blast and Water Shock for Tests A and B" of 27 September 1946 indicates that the peak air pressure was approximately 5.0 lbs per square inch and the duration of the positive pressure phase was about 0.95 seconds. The elastic deformation of the single hull, measured at four stations, was less than 0.03 inches.

(e) Effects Apparently Peculiar to the Atom Bomb.

An unusual evidence of the brief duration of heat from the atom bomb blast was noted on the maximum-minimum reading thermometer installed on the after cigarette deck. Although the starboard side of this thermometer was burned and blistered, the high temperature did not last long enough to raise the thermometer reading above 96° F.

III. Effects of Damage.

(a) Effect on machinery, electrical and ship control.

Not observed.

(b) Effect on gunnery and fire control.

Not observed.

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(c) Effect on watertight integrity and stability.

None.

(d) Effect on personnel and habitability.

Insofar as hull structure is concerned there is no effect on habitability. It is estimated that topside personnel exposed directly to the flash would have suffered flash burns.

(e) Effect on fighting efficiency.

None.

IV. General Summary of Observers' Impressions and Conclusions.

From inspection, the impression formed is that this ship was subjected to a directional flash of more or less instantaneous heat followed by a relatively high velocity wind. It is concluded that a submarine on the surface at such distance from an explosion of the type experienced in Test A will not be affected as far as hull material condition is concerned.

V. Preliminary Recommendations.

If it is expected that submarines will be subjected to such an attack it appears desirable to protect topside personnel to the maximum practicable extent with clothing and structural enclosures. As there is no significant material damage to this vessel no further recommendations are submitted herein.

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DETAILED DESCRIPTION OF HULL DAMAGE

A. General Description of Hull Damage.

No damage except as covered in B and T.

B. Superstructure.

There is a very slight dishing of some 5 pound plating on the port side of the conning tower fairwater. A 20" x 24" access door in the same 5 pound plating was blown in and distorted. There is no other damage.

C. Turrets, Guns and Directors.

No damage.

D. Torpedo Mounts, Depth Charge Gear.

No damage.

E. Weather Deck.

No damage.

F. Exterior Hull.

No damage.

G. Interior Compartments (above w.l.).

No damage.

H. Armor Decks and Miscellaneous Armor.

Not applicable.

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I. Interior Compartments (below w.l.).

No damage.

J. Underwater Hull.

No damage.

K. Tanks.

No damage.

L. Flooding.

None.

M. Ventilation.

No damage.

N. Ship Control.

No damage.

O. Fire Control.

No damage.

P. Ammunition Behavior.

No damage.

Q. Ammunition Handling.

No damage.

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USS DENTUDA (SS335)

R. Strength.

No damage.

S. Miscellaneous.

No comment.

T. Coverings.

There is a very slight scorching of the outer coat of paint on the exposed vertical surfaces of the starboard side of the superstructure and conning tower fairwater. The scorching extends the length of the vessel and is most severe high up on the periscope shears.

U. Welding and Rivetting.

No damage.

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TECHNICAL INSPECTION REPORT

SECTION I. MACHINERY

GENERAL SUMMARY OF MACHINERY DAMAGE

I. Target Condition After Test Able.

(a) Drafts after test; list; general areas of flooding, sources.

Draft and list were normal; no flooding occurred.

(b) Structural damage.

No structural damage was experienced.

(c) Other damage.

All machinery and equipment undamaged and operable.

II. Forces Evidenced and Effects Noted.

(a) Heat.

Momentary extreme heat from the direction of the bomb burst is evidenced by heavily scorched and blistered paint on external vertical surfaces toward the burst. See photograph on page 38. for scorched rubber eyepieces of after T.B.T.

(b) Fires and Explosions.

No fires or explosions occurred aboard.

(c) Shock.

No indication of shock to machinery plant was evidenced.

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USS DENTUDA (SS335)

(d) Pressure.

None evidenced.

(e) Effects apparently peculiar to the Atom Bomb.

Slight radioactivity and extreme momentary heat were only effects noted peculiar to the Atom Bomb.

III. Effects of Damage.

(a) Effect on machinery and ship control.

None. No damage.

(b) Effect on gunnery and fire control.

None. No damage.

(c) Effect on watertight integrity and stability.

None. No damage.

(d) Effect on personnel and habitability.

It is believed there would have been no effect on personnel inside the sealed pressure hull. Habitability was unimpaired. Personnel topside exposed to the blast would probably have suffered flash burns.

(e) Total effect on fighting efficiency.

None to material. Any personnel topside would have been at least temporarily out of action.

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IV. General Summary.

It is apparent that a submarine sealed up as for diving and rigged for depth charge attack yet still on the surface would be undamaged by an air burst of an atomic bomb of similar strength and at similar range as the Test A Bomb.

V. Preliminary Recommendations.

No comments considered necessary.

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DETAILED DESCRIPTION OF MACHINERY DAMAGE

A. General Description of Machinery Damage.

(a) Overall condition.

Undamaged.

(b) Areas of major damage.

None.

(c) Primary causes of damage in each area of major damage.

Machinery plant was undamaged.

(d) Effect of target test on overall operation of machinery plant.

Test A had no effect on operation of machinery plant. All machinery and equipment was tested and operated under service conditions with vessel underway. Diving machinery was tested by stationary trim dive.

B. Boilers.

Not applicable.

C. Blowers.

Not applicable.

D. Fuel Oil Equipment.

No damage.

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USS DENTUDA (SS335)

E. Boiler Feedwater Equipment.

Not applicable.

F. Main Propulsion Machinery.

No damage.

G. Reduction Gears.

No damage.

H. Shafting and Bearings.

No damage.

I. Lubrication System.

No damage.

J. Condensers and Air Ejectors.

Not applicable.

K. Pumps.

No damage.

L. Aux. Generators (Turbines and Gears).

Discussed under Item F.

M. Propellers.

No damage.

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USS DENTUDA (SS335)

N. Distilling Plant.

No damage.

O. Refrigeration Plant.

No damage.

P. Winches, Windlasses, and Capstans.

No damage.

Q. Steering Engine.

No damage.

R. Elevators, Ammunition hoists, etc.

Not applicable.

S. Ventilation (Machinery).

No damage.

T. Compressed Air Plant.

No damage.

U. Diesels (Generators and Boats).

Not applicable. See Item F.

V. Piping Systems.

No damage.

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W. Hydraulic System.

No damage.

X. Navigational Instruments.

No damage.

Y. Periscopes.

No damage.

Z. Radar and Sonar.

No damage.

ZZ. Miscellaneous.

None.

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TECHNICAL INSPECTION REPORT
SECTION III - ELECTRICAL
GENERAL SUMMARY OF ELECTRICAL DAMAGE

I. Target Condition After Test.

(a) Drafts after test; list; general areas of flooding, sources.

Not observed.

(b) Structural damage.

None.

(c) Damage.

No electrical equipment was damaged or inoperable due to the test except the starboard side-light and the stern light.

II. Forces Evidenced and Effects Noted.

(a) Heat.

There was no evidence of heat having affected any equipment inside the pressure hull. Topside cables in some few instances, where completely exposed, had a light covering of char or soot which could be rubbed off with the fingers, but in no case was the insulation damaged at all.

(b) Fires and explosions.

None.

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(c) Shock.

The starboard sidelight and the stern light were damaged by shock. The damage was confined to the lamps. They were not shattered but the filaments were broken. The lights operated properly when new lamps were installed. No other electrical equipment showed any effects due to shock.

(d) Pressure.

There was no evidence of pressure damage.

(e) Any effects apparently peculiar to the atom bomb.

Other than slight radioactivity, the charring of the ship's superstructure on the side toward the blast is the only phenomenon noted that may be considered peculiar to the atom bomb.

III. Effects of Damage.

(a) Effect on propulsion and ship control.

None.

(b) Effect on gunnery and fire control.

None.

(c) Effect on watertight integrity and stability.

Not observed.

(d) Effect on personnel and habitability.

None except for possible radiological effect and probably heat or blast effects on exposed personnel.

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(e) Total effect on fighting efficiency.

None.

IV. General Summary of Observers' Impressions and Conclusions.

There was no effect of any significance from the atom bomb on electrical equipment in this ship. It is considered that, even though on the surface, this submarine was outside the range of damage by the atom bomb.

V. Preliminary Recommendations.

None.

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DETAILED DESCRIPTION OF ELECTRICAL DAMAGE

A. General Description of Electrical Damage.

(a) Overall condition.

Damage to electrical equipment was very slight, being limited to failure of two outboard lights.

(b) Areas of major damage.

None.

(c) Primary causes of damage in each area of major damage.

None.

(d) Effect of target test on overall operation of electric plant.

The operability of the electric plant was not significantly impaired, either directly or indirectly by the atom bomb.

(e) Types of equipment most affected.

Outboard lights.

B. Electric Propulsion Rotating Equipment.

No damage.

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USS DENTUDA (SS335)

C. Electric Propulsion Control Equipment.

No damage.

D. Generators - Ship's Service.

Not applicable.

E. Generators - Emergency.

Not applicable.

F. Switchboards, Distribution and Transfer Panels.

No damage.

G. Wiring, Wiring Equipment and Wireways.

No damage. Topsides cables in some few instances, where completely exposed, suffered slight scorching of paint, but in no case was the insulation damaged.

H. Transformers.

No damage.

I. Submarine Propelling Batteries.

No damage. Batteries were fully charged and on open circuit during the test. Analysis of electrolyte samples after the test by Pearl Harbor Naval Shipyard revealed no significant changes attributable to the atom bomb. Commanding Officer's Report No. 11 states that a small concentration of hydrogen was found in each battery compartment on reboarding.

J. Portable Batteries.

Not applicable.

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USS DENTUDA (SS335)

K. Motors, Motor-Generator Sets and Motor Controllers.

No damage.

L. Lighting Equipment.

The only damage to lighting equipment was breakage of the filaments in the starboard side light and the stern light. These failures apparently were due to shock. However, it is probable that the filaments which failed were nearly burned out as one lamp which was examined had a whitish-gray deposit on the internal surface of the lamp. There were no other lamp failures on this ship.

M. Searchlights.

The signal searchlight was removed from ship during the test.

N. Degaussing Equipment.

Not applicable.

O. Gyro Compass Equipment.

No damage.

P. Sound Powered Telephones.

No damage.

Q. Ship's Service Telephones.

Not applicable.

R. Announcing Systems.

No damage.

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S. Telegraphs.

No damage.

T. Indicating Systems.

No damage.

U. I.C. and A.C.O. Switchboards.

No damage.

V. F.C. Switchboards.

No damage.

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SECTION IV

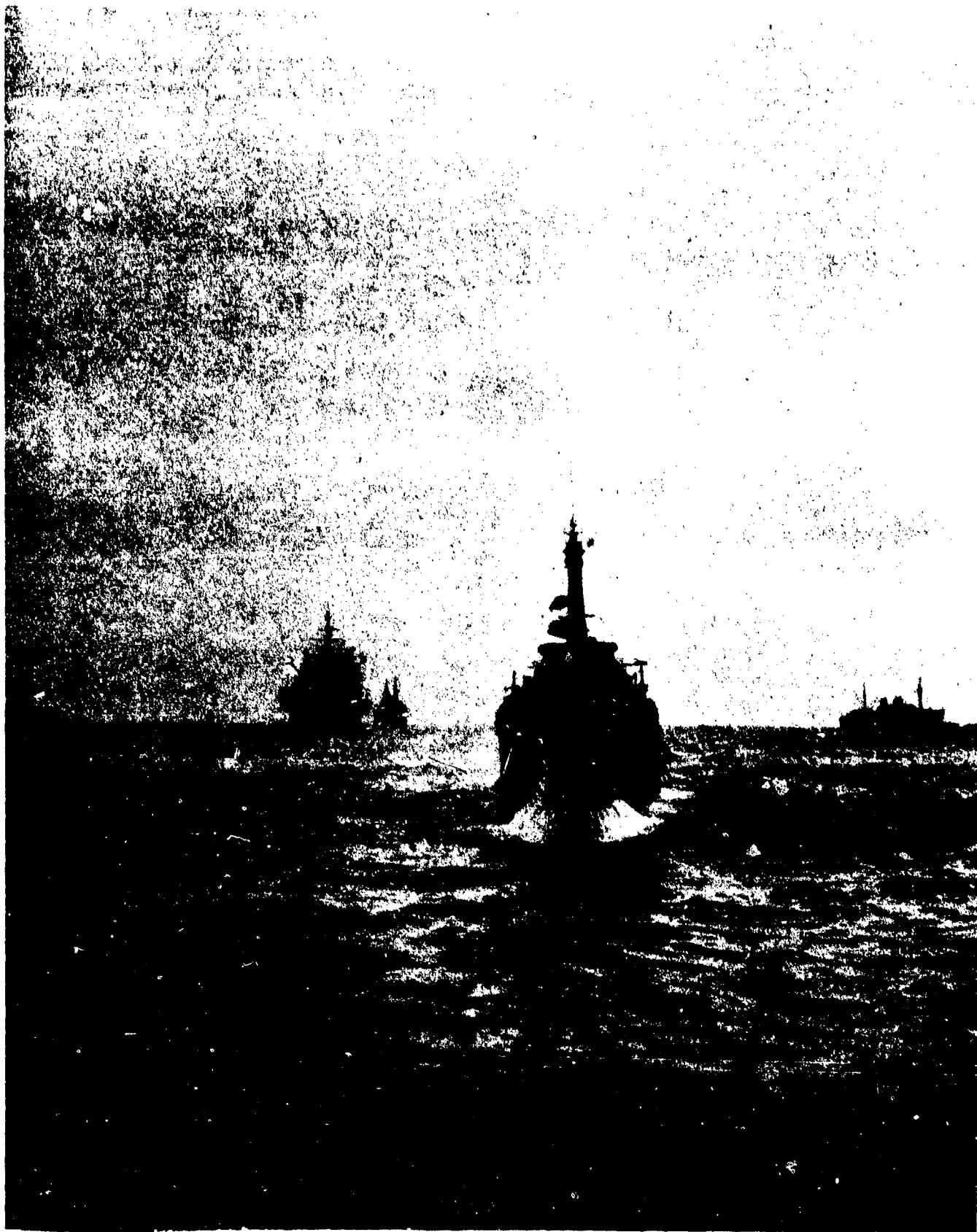
PHOTOGRAPHS

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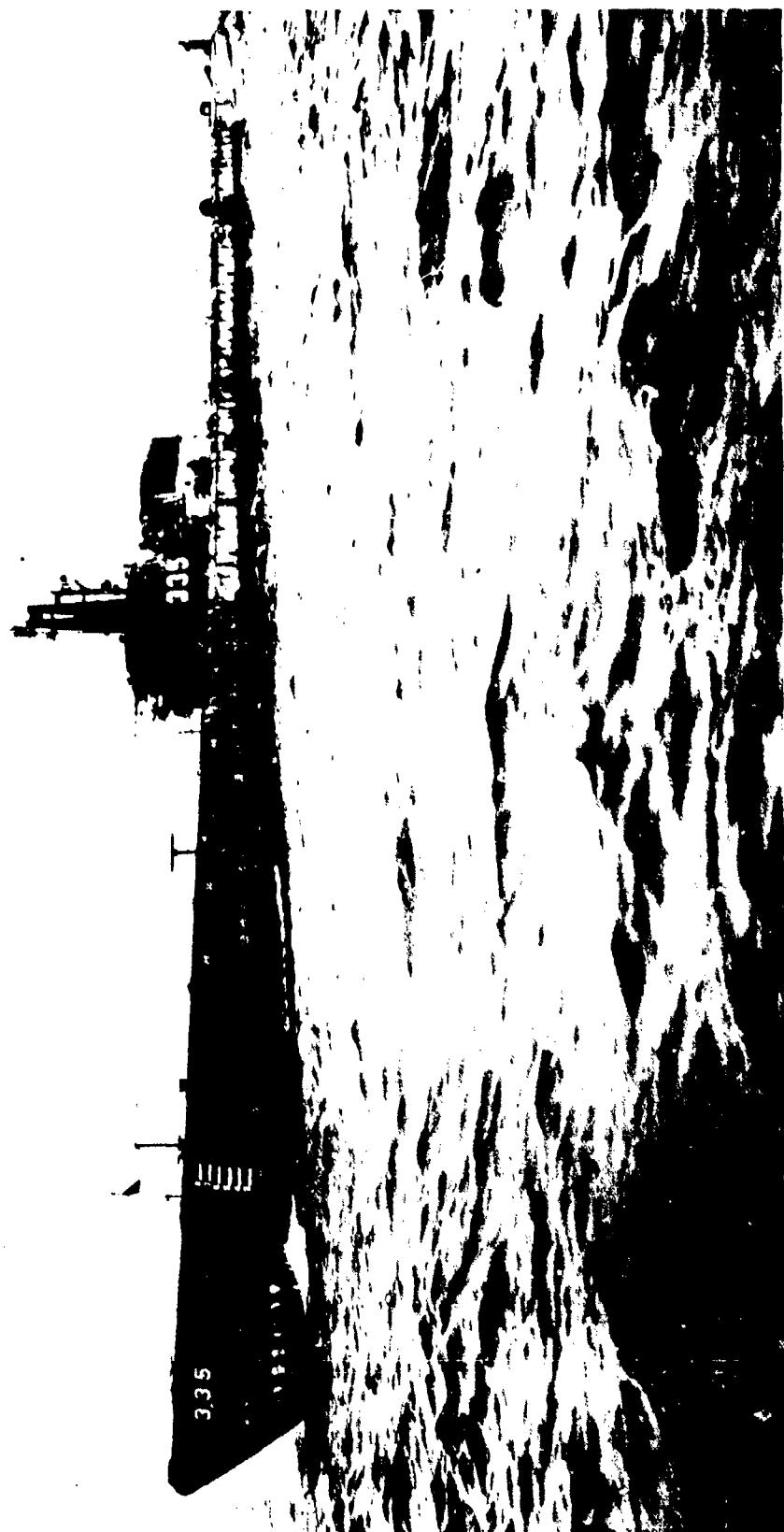
AACR-227-92-30. General view from ahead.

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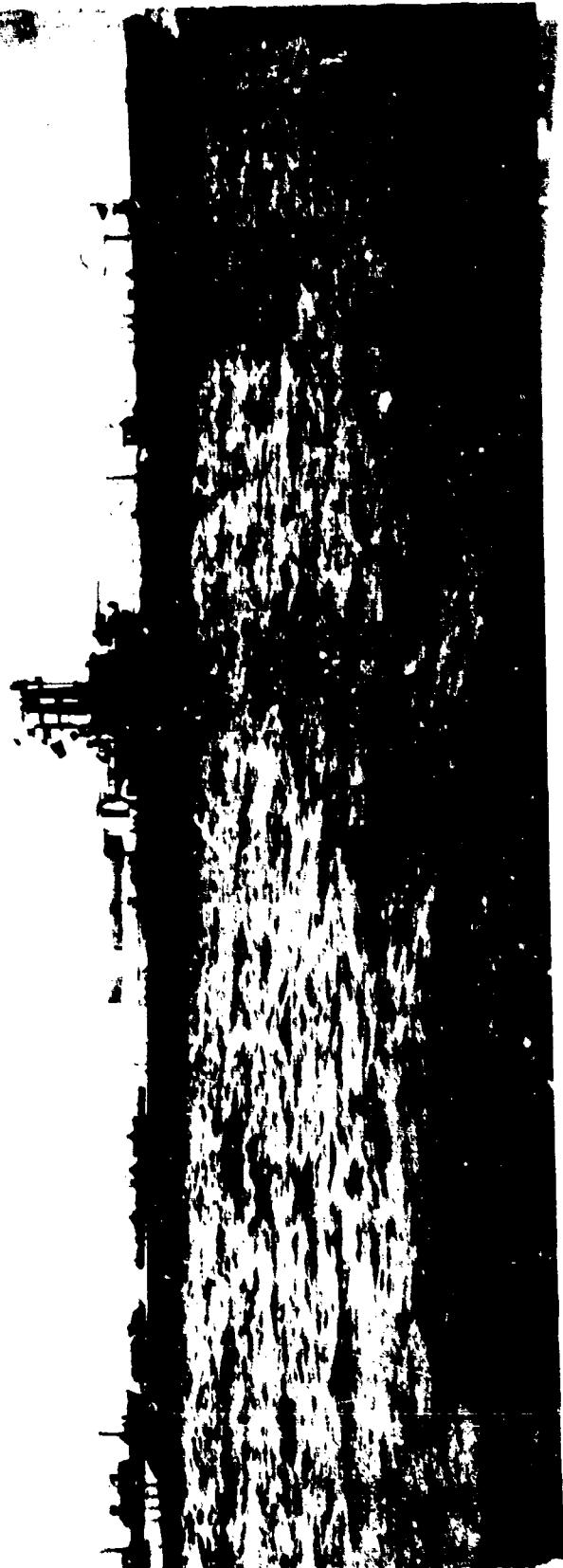
AACR-227-92-31. General view from starboard bow.

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AACR-227-92-32. General view from starboard beam.

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AACR-227-92-33. General view from starboard quarter.

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AACR-227-92-34. General view from astern.

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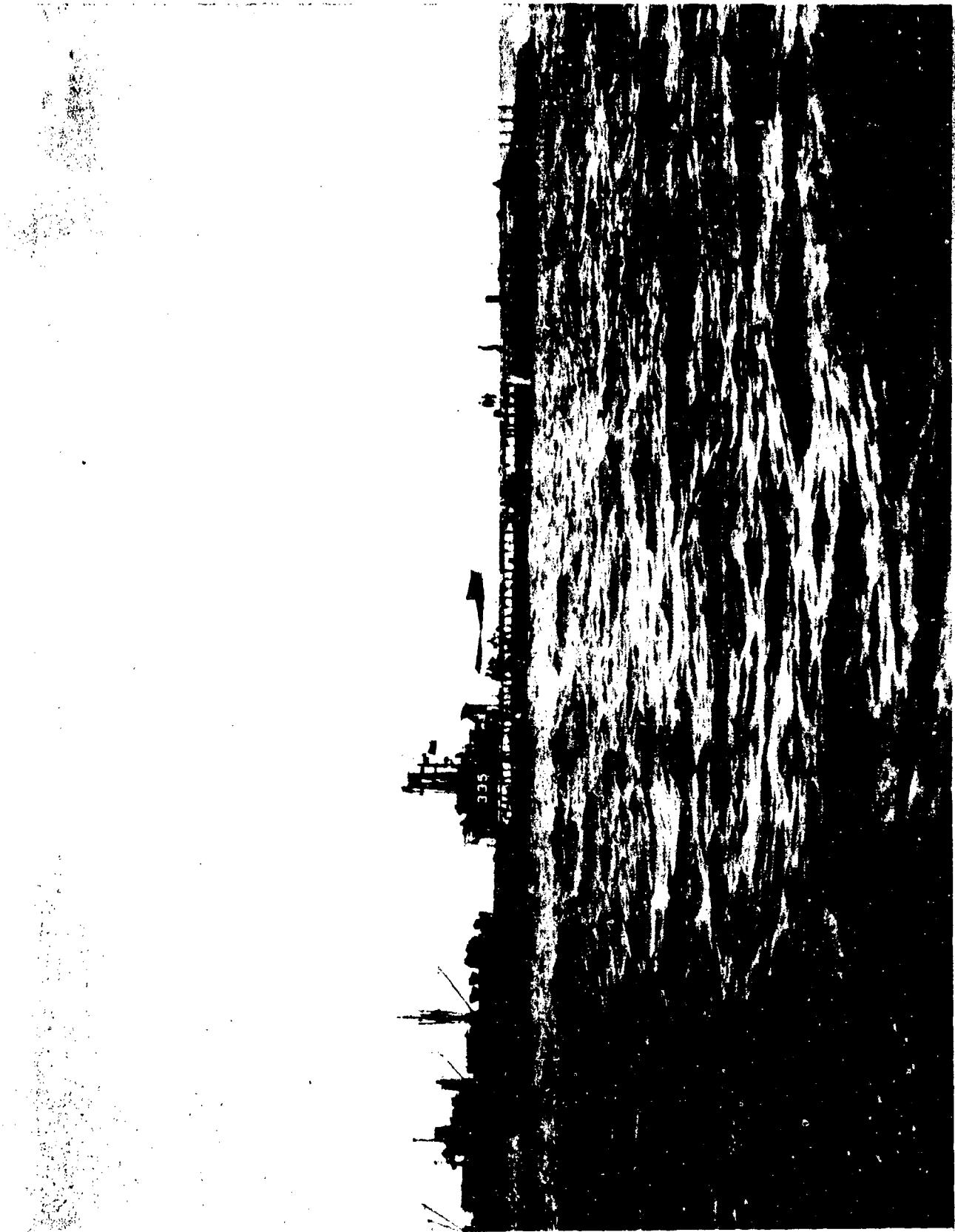
AACR-227-92-35. General view from port quarter.

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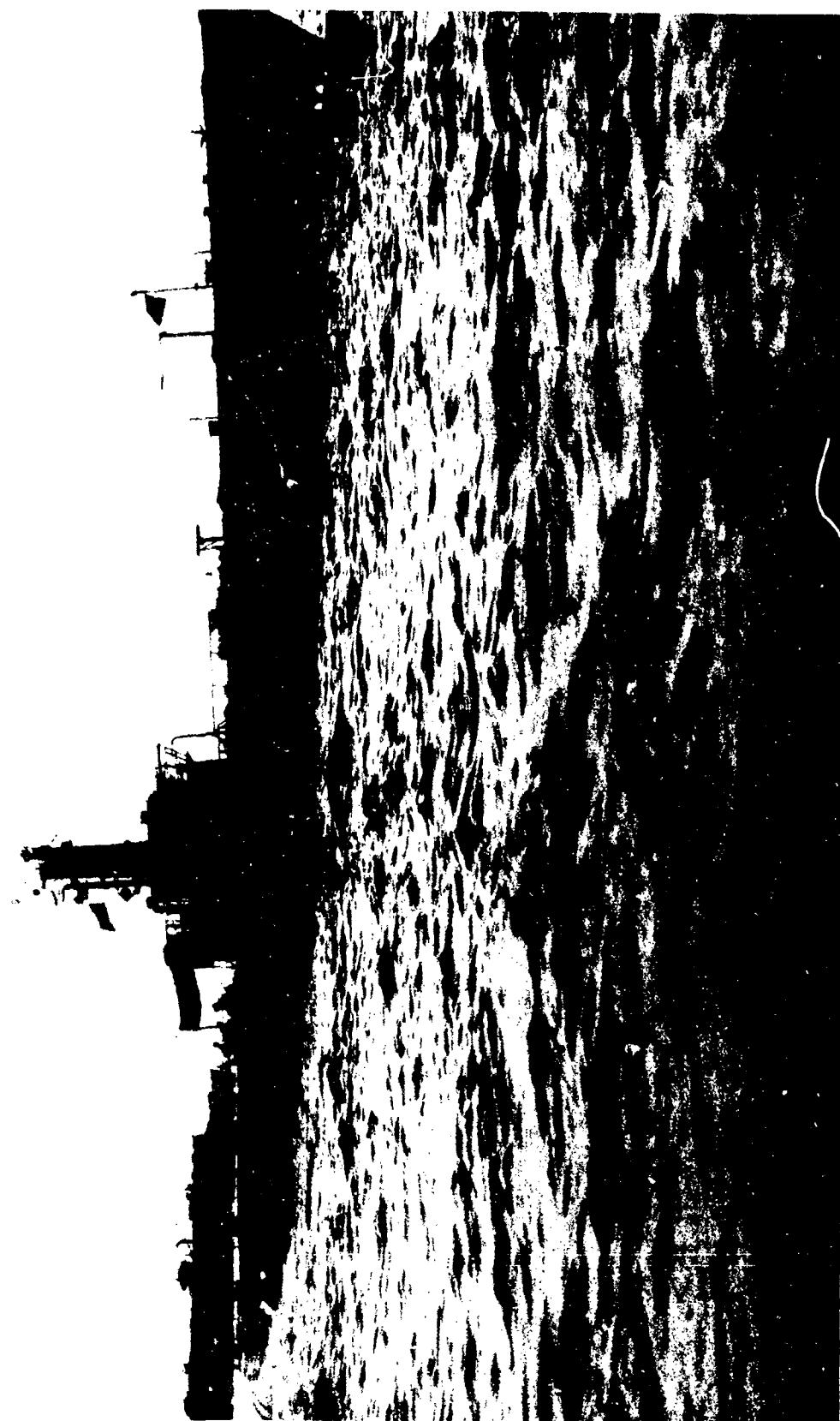
AACR-227-92-28. General view from port beam.

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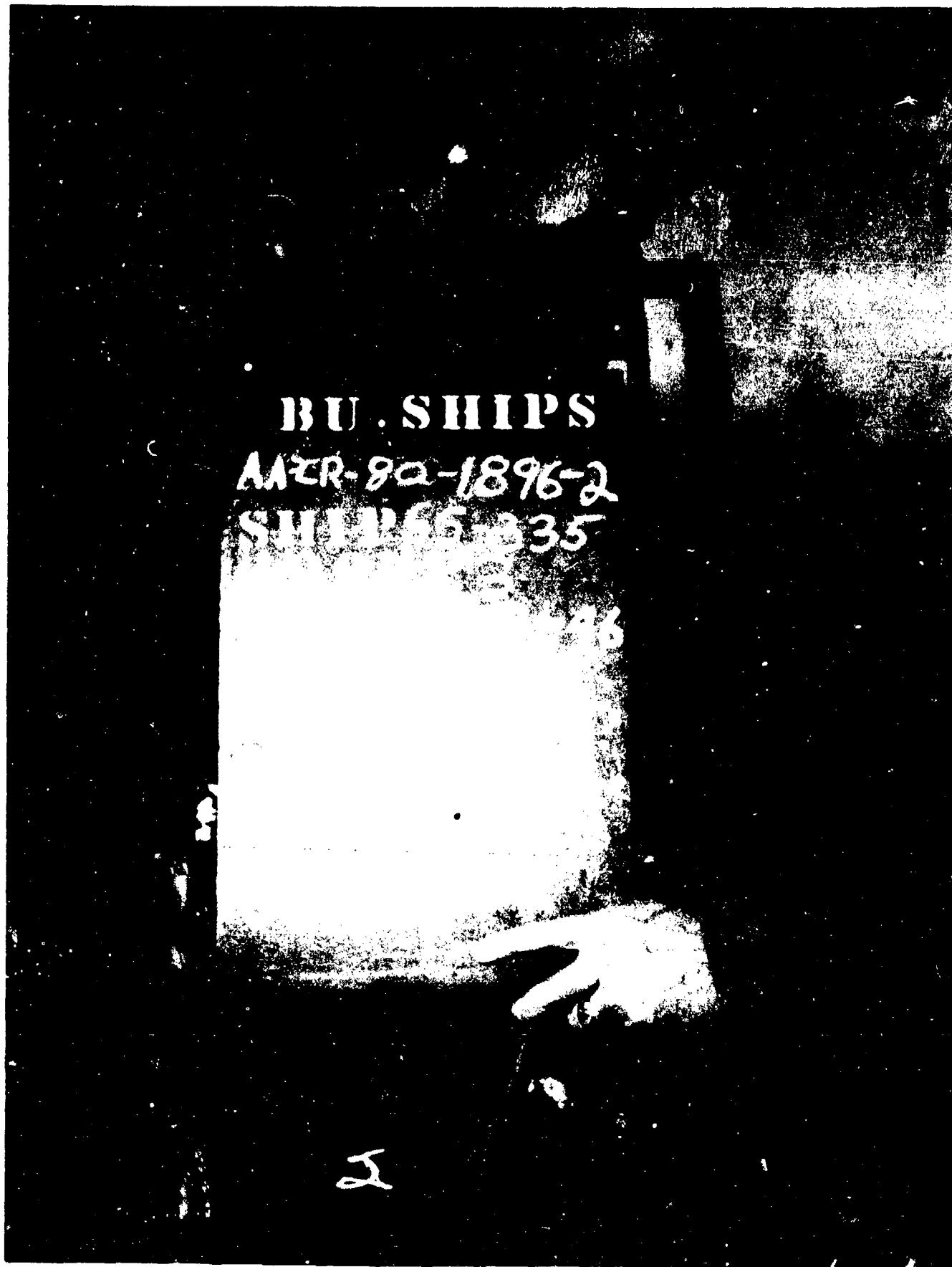
AACR-227- 92-29. General view from port bow.

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AACR-80-1896-2. After TBT scorched rubber eye piece.

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APPENDIX

COMMANDING OFFICER'S REPORT

TEST ABLE

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COMMANDING OFFICER'S REPORT

REPORT NO. 11

SECTION I

Name of Ship - U.S.S. DENTUDA (SS335)
Type - Submarine.
Class - Heavy Hull, Fleet Type, Built by the
Electric Boat Co.
Location in Array - Berth 141.

At the time of Test "ABLE", U.S.S. DENTUDA (SS335) was anchored in berth 141 in 29 fathoms of water, with 100 fathoms of chain out to the starboard anchor. The interior of the ship was rigged for maximum water-tight integrity in accordance with instructions given in the "Submarine Supplement" to the "Instructions for Target Vessels". The material condition of the ship was considered excellent; all machinery was in good operating condition. The ship carried a full load of fuel, torpedoes, and ammunition, the latter including the allowance in topside stowages. At the time of the test, one after torpedo tube (#10) had its outer door open, the tube being loaded with a Mk 16, Mod 3, torpedo with inert warhead. The protection given to explosive and inflammable material was the same that would have been afforded had the ship been carrying this material on war patrol.

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SECTION II

Upon reboarding the ship after test "ABLE", the topside superstructure and all appurtenances were intact. The paint was blistered on the starboard side indicating the ship had been subjected to intense heat on that side. Two navigational running lights failed to function, but this was the only material damage encountered.

Standard reentry procedure was followed in opening up the interior of the ship, tests being made for all gases and radioactivity. Small hydrogen concentrations were found in each battery compartment; but it was expected that this hydrogen would be given off by the main storage batteries since similar concentrations were encountered when the ship was sealed a similar period of time during the "Queen" day rehearsal. All internal machinery functioned perfectly; there was no interior damage whatever.

This ship was in the same material condition after test "ABLE" that it was in prior to the test. Its ability to remain in action and its fighting efficiency were not impaired even slightly from a material viewpoint.

The commanding officer hesitates to estimate the effect on personnel from the blast of the bomb. This type of ship would normally have a bridge watch of three lookouts and one or two officers, i.e., during war patrol. Rather than hazard a guess as to the fate of such a bridge watch, I prefer to leave such conjecture to a group more qualified to estimate such damage.

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USS DENTUDA (SS335)

SECTION III

PART A - GENERAL SUMMARY

1. Target Condition after test:

(a) Drafts after test 17' forward, 16'9" aft. List 1/2° starboard. No evidences of flooding.

(b) No structural damage.

(c) All machinery in good operating condition.

(d) Evidences of a quick flash of intense heat on starboard side. Paint blistered, but no evidences of any fire. Cannot estimate effects on personnel topside.

2. Forces evidenced and effects noted:

(a) Heat: The direction of the heat blast came apparently from a relative bearing of approximately 110°. Blistering of paint on the starboard side extends from bow to stern. There are no evidences of heat on any horizontal surfaces. Heat damage was more extensive near the top of the periscope shears (i.e. about 30 feet above the water line). The heat did not penetrate - caused only surface damage.

(b) There were no fires or explosions.

(c) The only evidence of shock noted was the breaking of the filaments in the starboard running light and stern anchor light. The maximum - minimum reading thermometer installed on the forward cigarette deck was apparently broken by shock.

(e) An unusual evidence of the brief duration of heat from the atom bomb blast was noted on the maximum - minimum reading thermometer installed on the after cigarette deck. Although the starboard side of this thermometer was burned and blistered, the high

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temperature did not last long enough to raise the thermometer reading above 96° F.

3. Results of Test on Target:

(a) - (e) No effect.

4. The vessel was subjected to a very brief flash of intense heat on her starboard side. There was a small shock wave sufficient to break the filaments in two navigational lights. There was no other damage noted.

5. Any preliminary general or specific recommendations of the inspecting group.

None.

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PART "C" - INSPECTION REPORT

SECTION I - HULL
(Submarines)

A. General Description of Hull Damage:

(a) Overall condition of vessel - excellent.

(b) General areas of hull damage. Apparent causes of hull damage in each area - no hull damage.

(c) Principal areas of flooding with sources - no flooding.

(d) Residual strength, buoyancy and effect of general condition of hull on operability - hull is in good operating condition.

B. Superstructure and Weather Decks:

(a) Description and causes of damage (give important dimensions).

1. No damage to:

Forward of conning tower.

Decks and framing.

Vertical plating and framing (incl. bulkheads).

Fittings.

Foundations.

2. No damage to:

Conning tower fairwater.

Decks and framing.

Vertical plating and framing (incl. bulkheads).

Fittings.

Foundations.

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3. No damage to:
 - Aft of conning tower.
 - Decks and framing.
 - Vertical plating and framing (incl. bulkheads).
 - Fittings.
 - Foundations.

4. No damage to:
 - Miscellaneous stowages in superstructure.

(b) Evidence of fire not covered in (a) above - no evidence of fire.

(c) Estimate of relative effectiveness against heat and pressure wave of:

1. Various plating thicknesses.
2. Various shaped surfaces.
3. Surfaces at various angles to line of attack.
4. Surfaces having difference in types of covering.
5. S.T.S. compared to MS.

No estimate can be made as no damage was experienced.

C. Turrets, Guns and Directors:

(a) Guns.

1. General condition of gun and foundations (could an intact gun be fired). No damage encountered, all equipment in good operating condition.

(b) Target Bearing Transmitter foundations.

1. General condition (could an intact TBT be trained). No damage encountered, all equipment in good operating condition.

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(c) Periscope and radar masts.

1. General condition of shears.
2. General condition of foundations.

No damage encountered, all equipment in good operating condition.

(d) Constructive criticism of design or construction. No damage encountered, all equipment in good operating condition.

D. Torpedo Tubes and Appurtenances:

(a) Tubes.

1. General condition especially as to watertight integrity.
2. What percent are out of action.

No damage encountered.

(b) Cradles and loading gear.

1. General condition of operability.

No damage encountered.

(c) Air flasks and war heads.

1. General condition.
2. Adequacy of protection.

No damage encountered.

(d) Constructive criticism of location, design and construction.

No damage encountered.

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E. Weather Deck:

Combined with Item B.

F. Exterior Hull Above Waterline:

(a) Condition and causes of damage to:

1. Pressure hull plating and framing.
2. Bow framing.
3. Stern framing.
4. Welding.
5. Structural castings.

No damage encountered.

(b) Constructive criticism of design or construction. No damage encountered.

G. Compartments:

(a) Damage to shell, bulkheads and framing and causes - no damage encountered.

(b) Damage to joiner bulkheads, decks, and floorplates and causes - no damage encountered.

(c) Damage to access closure and cause - No damage encountered.

(d) Damage to hull fittings and equipment and causes - no damage encountered.

(e) Damage to foundations, shock mounts, and sound mounts and causes (include battery tanks) - no damage encountered.

(f) Evidences of fire - no damage encountered.

(g) Damage to watertight integrity and causes - no damage encountered.

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(h) Estimate of reduction in watertight subdivision, habitability and utility of compartments and casualties to personnel - no damage encountered.

(i) Constructive criticism as to design or construction - no damage encountered.

H. Armor Decks:

(a) None fitted.

I. (Combined with Item G).

J. Underwater Hull:

(a) Condition and causes of damage to:

1. Pressure hull plating and framing.
2. Bow framing.
3. Stern framing.
4. Structural castings.
5. Struts and stern tubes.
6. Rudders and planes.
7. Keels.
8. Miscellaneous fittings.

No damage that can be observed.

(b) Effect of damage on:

1. Buoyancy.
2. Operability surfaced and submerged.
3. Maneuverability and resistance.

No damage that can be observed.

(c) Constructive criticism as to design or construction - no damage that can be observed.

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K. Tanks.

(a) Condition and causes of damage to:

1. Exterior tanks.
2. Interior tanks.

No damage observed.

(b) Leakage and causes for all tanks. - No damage observed.

(c) Constructive criticism as to design, construction or location - No damage observed.

L. Flooding:

(a) Description of major flooding areas - None.

(b) Sources of flooding.

1. Opened boundaries.
2. Failure of access closures.
3. Failure of piping, ducting or wiring.

None.

(c) List of compartments or tanks believed to have flooded slowly so as to be susceptible to damage control - None.

(d) Constructive criticism as to design or construction - None.

M. Ventilation:

(a) Condition and causes of damage to:

1. Hull and battery ventilation system outboard.
2. Engine induction system.
3. Ventilation system inboard.

No damage observed, no evidence of heat, smoke or water conducted into any compartment.

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(b) Evidences that ventilation system conducted heat, blast, fire, smoke or water into any compartment - No damage observed, no evidence of heat, smoke or water conducted into any compartment.

(c) Constructive criticism of design or construction - No damage observed, no evidence of heat, smoke or water conducted into any compartment.

N. Ship Control and Fire Control Stations:

(a) Damage to control stations due to failure of compartment boundaries.

1. Bridge.
2. Conning tower.
3. Control room.

No damage observed.

(b) Constructive criticism of layout, arrangement, and protection.

No damage observed.

O. (Combined with Item N).

P. Ammunition Stowage:

(a) Condition and causes of damage to:

1. Ready service stowage.
2. Magazines.
3. Constructive criticism as to location, protection performance, and design or construction.

No damage observed.

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Q. Ammunition Handling:

(a) Condition, operability and causes of damage to:

1. Passing scuttle.
2. Torpedo loading cradles.
3. Torpedo loading derrick.

No damage noted.

(b) Constructive criticism of design construction or location.

No damage noted.

R. Strength:

(a) Details of any damage to and causes of damage to:

1. Pressure hull plating including conning tower.
2. Pressure hull framing.
3. Main bulkheads.
4. Welding or other joints.
5. Structure in way of discontinuities.

No damage noted.

(b) Constructive criticism.

No damage noted.

S. Miscellaneous:

No remarks.

T. Coverings:

(a) Condition and cause of damage to:

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1. Paint.
 - Exterior topside.
 - Exterior below waterline.
 - Interior.
2. Galvanizing, plating, etc.
3. Linoleum.
4. Non skid.

Exterior paint on vertical surfaces on the starboard side above the waterline from bow to stern scorched and blistered. All other paint and coverings normal.

U. Welding and Riveting:

- (a) General summary of welding performance - no damage noted.
- (b) General summary of rivet performance - no damage noted.
- (c) Constructive criticism - no damage noted.

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PART "C" - INSPECTION REPORT

SECTION II - MACHINERY
(Submarines)

A. General Description of Machinery Damage:

- (a) Overall condition - no machinery damage.
- (b) Areas of major damage - no machinery damage.
- (c) Primary causes of damage in each area of major damage - no machinery damage.
- (d) Effect of Target Test on overall operation of machinery plant - no machinery damage.

B. Boilers (S-51):

Not applicable.

C. Blowers (S-53):

Not applicable.

D. Fuel Oil Equipment (S-55):

- (a) Heaters - no damage.
- (b) Strainers - no damage.
- (c) Manifolds - no damage.
- (d) Fittings (thermometers, gages) - no damage.
- (e) Flexible fueling hose - no damage.

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E. Boiler Feedwater Equipment (S-56):

Not applicable.

F. Main Propulsion Machinery (S-41):

(a) Main and auxiliary engine.

1. Foundations - no damage.
2. Casings and cylinders - no damage.
3. Bearings, crankshafts, pistons, etc. - no damage.
4. Couplings - no damage.
5. Fuel injection system - no damage.
6. Superchargers - no damage.
7. Governors - no damage.
8. Inboard and outboard exhaust valves - no damage.
9. Mufflers and exhaust piping - no damage.
10. Cooling system - no damage.

G. Reduction Gears (S-42):

- (a) Foundations and casings - no damage.
- (b) Gears and shafting - no damage.
- (c) Bearings - no damage.
- (d) Couplings (flexible and solid) - no damage.
- (e) Fittings (oil sights, thermometers, etc.) - no damage.
- (f) Turning gears - no damage.

H. Shafting and Bearings (S-43):

- (a) Shafting - no damage.
- (b) Bearings and bearing foundations - no damage.

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- (c) Alignment - no damage.
- (d) Hull packing gland - no damage.
- (e) Thrust bearings - no damage.
- (f) Strut bearings - no damage.

I. Lubrication System (S-45):

- (a) Coolers - no damage.
- (b) Filters and strainers - no damage.
- (c) Purifiers - no damage.
- (d) Tanks (sump, settling etc.) - no damage.
- (e) Fittings (gauges, etc.) - no damage.

J. Condensers and Air Ejectors (S-46):

Not applicable.

K. Pumps (S-47):

- (a) Booster drain pump - no damage.
- (b) Circulating pumps - no damage.
- (c) Trim pump - no damage.
- (d) Drain pump - no damage.
- (e) Priming pumps - no damage.
- (f) Fuel oil pumps - no damage.
- (g) Lubricating oil pumps - no damage.

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(h) Distiller feed pump - no damage.

L. Auxiliary Generators (S-61):

Discussed under Item F (Main Propulsion).

M. Propellers (S-44):

(a) Blades - no damage.

(b) Caps, nuts, etc. - no damage.

N. Distilling Plant (S-59):

(a) Distillers - no damage.

(b) Compressors - no damage.

(c) Miscellaneous valves fittings, gages, attached piping, etc. - no damage.

O. Refrigerating and Air Conditioning Plants (S-59):

(a) Compressors - no damage.

(b) Motors - no damage.

(c) Condensers - no damage.

(d) Foundations - no damage.

(e) Refrigerant piping and cooling coils - no damage.

(f) Insulation and lagging - no damage.

(g) Miscellaneous valves, switches, controls, fittings, etc. - no damage.

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P. Winches, Windlasses, and Capstans (S20, S26):

- (a) Foundations and bed plates - no damage.
- (b) Brakes and brake lining - no damage.
- (c) Gearing - no damage.
- (d) Drums, bearings, shafting - no damage.
- (e) Hydraulic systems - no damage.
- (f) Fittings, valves, etc. - no damage.

Q. Steering and Diving:

- (a) Steering rams and cylinders - no damage.
- (b) Hydraulic systems including pumps piping, etc. - no damage.
- (c) Bow plane rigging mechanism - no damage.
- (d) Bow plane tilting mechanism - no damage.
- (e) Stern plane tilting mechanism - no damage.
- (f) Foundations - no damage.
- (g) Miscellaneous (steering stands, valves, gages, etc.) - no damage.

R. Elevators, Ammunition Hoists, etc. (S83):

Not applicable.

S. Ventilation (Machinery) (S-38):

- (a) Battery ventilation blowers - no damage.

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- (b) Battery air flow meters - no damage.
- (c) Hull supply and exhaust blowers - no damage.
- (d) Engine air and ventilation induction hull valves and mechanisms - no damage.
- (e) Bulkhead flappers - no damage.
- (f) Foundations and mountings - no damage.
- (g) Fans and motors - no damage.

T. Compressed Air Plant (S-49):

- (a) High pressure air compressors - no damage.
- (b) Low pressure blowers - no damage.
- (c) Foundations - no damage.
- (d) Coolers - no damage.
- (e) Air banks - no damage.
- (f) Torpedc impulse flasks - no damage.
- (g) Miscellaneous gages, attached piping, etc. - no damage.

U. Diesels (S-50):

Not applicable (See Item F.).

V. Piping Systems (S-48):

- (a) High Pressure (3000 lb.) air piping - no damage.
- (b) Main ballast tank blow (600 lb.) air piping - no damage.

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- (c) Service (200 lb.) air piping - no damage.
- (d) Main ballast tank blow (10) air piping - no damage.
- (e) Torpedo Impulse Air piping - no damage.
- (f) Engine air starting piping - no damage.
- (g) Engine shut-down air piping - no damage.
- (h) Salvage air piping - no damage.
- (i) Main ballast tank vent piping - no damage.
- (j) Hull and battery ventilation piping - no damage.
- (k) Trimming system piping - no damage.
- (l) Drain system piping - no damage.
- (m) Magazine flooding piping - no damage.
- (n) Plumbing piping - no damage.
- (o) Fuel oil piping - no damage.
- (p) Fuel oil compensating piping - no damage.
- (q) Lubricating oil piping - no damage.
- (r) Hydraulic system piping - no damage.
- (s) Engine cooling salt water piping - no damage.
- (t) Engine cooling fresh water piping - no damage.
- (u) Main motor cooling salt water piping - no damage.
- (v) Distiller feed piping - no damage.

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- (w) Refrigeration circulating water piping - no damage.
- (x) Air conditioning circulating water piping - no damage.
- (y) Freon piping and coils - no damage.
- (z) Air compressor circulating water piping - no damage.
- (aa) Portable fresh water piping - no damage.
- (bb) Battery water piping - no damage.

W. Hydraulic System (S-21):

- (a) Main hydraulic pumps - no damage.
- (b) Hydraulic Accumulator - no damage.
- (c) Main vent hydraulic operating mechanisms - no damage.
- (d) Ballast tank flood valve hydraulic operating mechanisms - no damage.
- (e) Engine air induction valve operating mechanism - no damage.
- (f) Ventilation induction valve operating mechanism - no damage.
- (g) Main engine exhaust valve operating mechanisms - no damage.
- (h) Auxiliary engine exhaust valve operating mechanism - no damage.
- (i) Sound head lower/raise mechanism - no damage.
- (j) Hydraulic hand pump for sound heads - no damage.

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(k) Hydraulic periscope lower/raise mechanism - no damage.

(l) Hydraulic SD/SV radar mast lower/raise mechanism - no damage.

(m) Bow plane hydraulic tilting mechanism - no damage.

(n) Stern plane hydraulic tilting mechanism - no damage.

(o) Bow plane hydraulic rigging mechanism - no damage.

X. Navigational Instruments (S-24):

(a) Underwater log - no damage.

(b) Magnetic compasses - no damage.

Y. Periscopes:

(a) Optics, bearings, train, stadimeter, etc. - no damage.

(b) Mechanical hoist mechanism - no damage.

Z. Radar and Sonar (S67, S68):

(a) Mechanical hoisting mechanism - no damage.

(b) Training mechanism - no damage.

AA. Miscellaneous:

Machinery not included in above groups should be covered here - No comment.

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PART "C" - INSPECTION REPORT

SECTION III - ELECTRICAL
(Submarines)

A. General Description of Electrical Damage:

(a) Overall condition.

(b) Areas of major damage.

(c) Primary causes of damage in each area of major damage.

(d) Operability of electric plant.

1. Electrical propulsion.
2. Main storage batteries.
3. Auxiliary power.
4. Communications.
5. Fire control circuits.
6. Lighting.
7. Ventilation.

(e) Types of equipment most affected.

1. Switchboards and switchgear.
2. Rotating machinery
3. Motor controllers.
4. Cables and supports.

The only electrical damage suffered by this vessel was the damaging of the port running light and the stern anchor light. The filaments in the bulbs were apparently broken.

B. Electric Propulsion Rotating Equipment (Propulsion motors, propulsion generators, submarine auxiliary generators, exciters, motor-generator sets). (S-41):

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- (a) Frame and mountings - no damage.
- (b) Commutator or slip rings - no damage.
- (c) Brushes and brush rigging - no damage.
- (d) Bearings - no damage.
- (e) Fans or blowers - no damage.
- (f) Internal lighting fixtures - no damage.
- (g) Air coolers and filters - no damage.

C. Electric Propulsion Control Equipment (Propulsion control cubicles, transfer switch panels, controllers for motor-generator sets). (S-41):

- (a) Framework and mountings - no damage.
- (b) Electrical connections and wiring - no damage.
- (c) Busbars - no damage.
- (d) Contactors, switches and relays.
- (e) Rheostats and resistors - no damage.
- (f) Mechanical operating mechanisms and interlocks - no damage.
- (g) Insulating materials - no damage.
- (h) Instruments - no damage.
- (i) Fuses - no damage.
- (j) Rectifiers - no damage.
- (k) Regulators - no damage.

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D. Generators - Ships Service (S-61):

See Item K.

E. Generators - Emergency (S-61):

Not applicable.

F. Switchboards, Distribution and Transfer Panels (Ships Service, Emergency, Battery Charging, Lighting and Test Switchboards - Power and Lighting Distribution Panels - Submarine Torpedo Heating and Hydrogen Burning Panels - Transfer Panels - Degaussing Panels). (S-62).

- (a) Framework and Mountings - no damage.
- (b) Electrical connections and wiring - no damage.
- (c) Busbars - no damage.
- (d) Circuit breakers, contactors, switches and relays - no damage.
- (e) Rheostats and resistors - no damage.
- (f) Mechanical operating mechanisms and interlocks - no damage.
- (g) Insulating materials - no damage.
- (h) Instruments - no damage.
- (i) Rectifiers - no damage.
- (j) Fuses - no damage.
- (k) Voltage regulators - no damage.

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G. Wiring, Wiring Equipment, and Wireways (S-62):

(a) Cable (Power, lighting, I.C., F.C., propulsion, and degaussing.)

(b) Wireway supports.

(c) Connection, junction boxes, receptacles, and plugs.

No damage except slight burning of exposed rubber insulation topside.

H. Transformers (Lighting and I.C.) (S-62):

(a) Framework and mountings - no damage.

(b) Electrical connections - no damage.

I. Submarine Propelling Batteries (S-62):

(a) Jars - no damage.

(b) Covers - no damage.

(c) Wedges and strongbacks - no damage.

(d) Busbars and cell connections - no damage.

(e) Acid spillage - no damage.

J. Portable Batteries (S-62):

(a) Mounting - no damage.

(b) Jars - no damage.

(c) Cell and cable connections - no damage.

(d) Acid spillage - no damage.

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K. Motors, Motor Generator Sets, and Motor Controllers. Motor and controllers for engine room auxiliaries, Steering gear, Deck auxiliaries, Air conditioning and refrigeration, Ventilation, Distilling equipment, etc. - Motor generator sets for lighting, welding, degaussing, battery charging, interior communications, etc.) (S63):

(a) Rotating Equipment:

1. Framework and mounting.
2. Commutator or slip rings.
3. Brushes and brush rigging.
4. Bearings.
5. Speed regulators.

No damage.

(b) Control Equipment:

1. Framework and mounting.
2. Electrical connections and wiring.
3. Contactors, switches and relays.
4. Rheostats and resistors.
5. Insulating materials.
6. Pilot circuit devices.
7. Brakes.

No damage.

L. Lighting Equipment (S-64):

(a) Lamps (Rough service, rough service high impact and fluorescent lights).

(b) Reflectors.

(c) Fixture mounts.

(d) Shock mounts (U-strap type and plate type).

(e) Pendant lamp holders.

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(f) Lamp globes.

No damage, except to bulbs in two running lights as noted in Item A.

M. Searchlights (36", 24", 12", and 8") (S-66):

(a) Framework and mountings.

(b) Front glass.

(c) Shutter and operating mechanism.

(d) Locks and brakes.

(e) Arc Lamp feed rods.

(f) Incandescent lamps.

(g) Rheostats.

Searchlight removed from ship to transport - no damage.

N. Degaussing Equipment (S-81):

Not applicable.

O. Gyro Compass Equipment (S-24):

(a) Master - no damage.

(b) Repeaters - no damage.

(c) DRT and DRA - no damage.

P. Sound Powered Telephones:

(a) Headsets - no damage.

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- (b) Handsets - no damage.
- (c) Jack and switch boxes - no damage.
- (d) Stowage - no damage.

Q. Ships Service Telephones:

Not applicable.

- (a) Exchange.
- (b) Line equipment.

R. Announcing Systems:

Not applicable.

- (a) Portable (PAM and PAB).
- (b) Amplifier racks.
- (c) Control racks.
- (d) Transmitting station.
- (e) Reproducers.
- (f) Inter-communicating units.

S. Telegraphs:

No damage.

T. Indicating Systems:

No damage.

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U. I.C. and A.C.O. Switchboards:

No damage.

V. F.C. Switchboards:

No damage.

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PART "C" - INSPECTION REPORT

SECTION IV - ELECTRONICS
(Submarines)

A. General Description of Electronic Damage:

- (a) Overall Condition.
- (b) Areas of Major Damage.
- (c) Primary cause of damage in each area.
- (d) Operability of Electronics Equipment:
 - 1. Radar
 - 2. Radio
 - 3. Sonar
 - 4. Loran
 - 5. Other
- (e) Types of Equipment most effected.

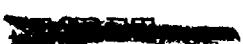
There was no damage to electronic equipment observed. Starboard and whip antennas megged low because of a carbon dust on the insulators. Resistance of insulators normal after cleaning.

B. Fire Control Radar:

No damage observed.

C. Surface Search Radar:

No damage observed.

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D. Air Search Radar:

No damage observed.

E. Radar Repeaters:

No damage observed.

F. Radar Counter Measures Equipment:

No damage observed.

G. Radar and Radio Beacons:

No damage observed.

H. IFF Equipment:

No damage observed.

I. Communication Transmitters (Radio):

No damage observed.

J. Communication Receivers (Radio):

No damage observed.

K. Communication Antennae (Radio):

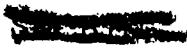
No damage observed.

L. Radio Transceivers (Combined Transmitters and Receivers):

No damage observed.

M. Sonar Echo Ranging and Listening Equipment:

No damage observed.

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N. Sonar Echo Sounding Equipment and Altimeters:

No damage observed.

O. Loran Navigation Equipment:

No damage observed.

P. Power Supplies (Motor Generators and Filters):

No damage observed.

Q. Television and Teletype Equipment:

No damage observed.

R. Test Equipment (Including Frequency Meters):

No damage observed.

S. Instrumentation:

No damage observed.

T. Telephone Equipment:

No damage observed.

U. Direction Finders (Radio):

No damage noted.

V. Spare Parts:

No damage observed.

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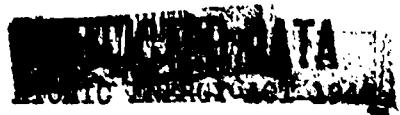
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Classification (Revised) (Changed to _____)

By Authority of Joint Chiefs of Staff Action of 15 April 1949

*John D. Blandish Date 2-8-51
J. D. Blandish Dated 2-8-51
J. D. Blandish Dated 2-8-51
J. D. Blandish Dated 2-8-51*



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Defense Special Weapons Agency
6801 Telegraph Road
Alexandria, Virginia 22310-3398

TRC

9 April 1997

MEMORANDUM FOR DEFENSE TECHNICAL INFORMATION CENTER
ATTENTION: OMI/Mr. William Bush

SUBJECT: Declassification of Reports

The Defense Special Weapons Agency (formerly Defense Nuclear Agency) Security Office has reviewed and declassified the following reports:

+ ST-H

AD-366748 -	XRD-65
AD-366747 -	XRD-64
AD-366746 -	XRD-63
AD-376826 -	XRD-60
AD-376824 -	XRD-58
AD-376825 -	XRD-59
AD-376823 -	XRD-57
AD-376822 -	XRD-56
AD-376821 -	XRD-55
AD-366743 -	XRD-54
AD-376820 -	XRD-53
AD-366742 -	XRD-52
AD-366741 -	XRD-51
AD-366740 -	XRD-50-Volume-2
AD-366739 -	XRD-49-Volume-1
AD-366738 -	XRD-48
AD-366737	XRD-47

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AD-366736 -	XRD-46
AD-366735 -	XRD-45
AD-366723 -	XRD-37
AD-366721 -	XRD-35
AD-366717 -	XRD-31-Volume-2
AD-366716 -	XRD-30-Volume-1
AD-366751 -	XRD-68-Volume-2
AD-366750 -	XRD-67-Volume-1
AD-366752 -	XRD-69
AD-366744 -	XRD-61.

All of the cited reports are now **approved for public release**. **Distribution statement "A"** now applies.

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